

Design Considerations for Fusible Heat Sink

Thomas J. Cognata

Jacobs Engineering

Thomas O. Leimkuehler

Paragon Space Development Corporation

Rubik B. Sheth

NASA Johnson Space Center

ABSTRACT

Traditionally radiator designs are based off a passive or flow through design depending on vehicle requirements. For cyclical heat loads, a novel idea of combining a full flow through radiator to a phase change material is currently being investigated. The flow through radiator can be designed for an average heat load while the phase change material can be used as a source of supplemental heat rejections when vehicle heat loads go above the average load. Furthermore, by using water as the phase change material, harmful radiation protection can be provided to the crew. This paper discusses numerous trades conducted to understand the most optimal fusible heat sink design for a particular heat load. Trades include configuration concepts, amount of phase change needed for supplemental heat rejection, and the form of interstitial material needed for optimal performance. These trades were used to culminate to a fusible heat sink design. The paper will discuss design parameters taken into account to develop an engineering development unit.